

The Supply Chain: Logistics of Life

(Year 8 - Ages 13-14)

Lesson 3 of 9

Lesson Summary

The "Butterfly Effect" relies on a functional system to carry the wind. In Lesson 3, students become Logistics Managers. This 60-minute lesson demystifies the complex journey of an organ from donor to recipient.

Students will analyze the "Cold Ischaemia Time" (the time an organ survives outside the body) as the critical constraint of the current system. They will map the "Supply Chain"—from ICU to retrieval, transport (jets/helicopters), and transplant. Finally, they will investigate "Future Tech" innovations like Machine Perfusion ("Heart in a Box") and 3D Bioprinting, evaluating how these technologies might extend the timeline and save more lives in the future.

Learning Intentions

Students will

- Analyze the logistical constraints of organ transplantation, specifically Ischaemia Time (viability outside the body).
- Map the sequence of events in the "Donation Supply Chain" to understand the need for rapid coordination.
- Investigate how new technologies (Machine Perfusion, Bioprinting) are solving the problems of time and supply.
- Evaluate the ethical and scientific impact of moving from a "scarcity" model to a "regenerative" model of medicine.

Success Criteria

Students can

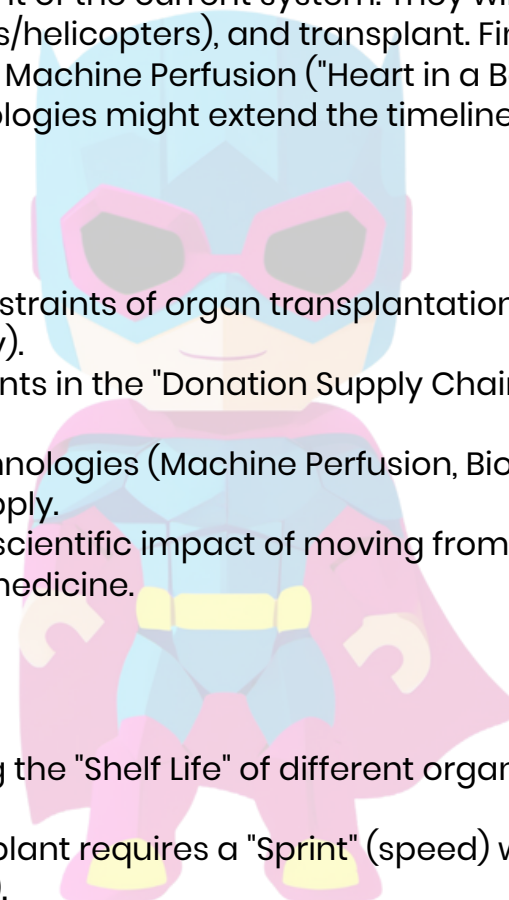
- Create a timeline showing the "Shelf Life" of different organs (Heart = 4-6 hours, Kidney = 24 hours).
- Explain why a heart transplant requires a "Sprint" (speed) while a tissue transplant allows for a "Marathon" (storage).
- Describe one future technology (e.g., Warm Perfusion) and how it improves upon the current method (Ice Storage).
- Use technical terms like Ischaemia, Perfusion, and Logistics correctly.

Lesson Details

Time:	60 minutes
Year Level:	Year 8 (Ages 13-14)
Unit:	This is Lesson 3 of 9 in the series.
Educational Partner:	This lesson is adapted from resources provided by DonateLife

General Capabilities

Scientific Literacy; Critical and Creative Thinking; Information and Communication Technology (ICT) Capability; Ethical Understanding.



Curriculum Mapping and Links

Australian Curriculum (v9.0)

Subject	Strand	Content Descriptor
Science	Science as a Human Endeavour	<u>AC9S8H02</u> : Investigate how scientific knowledge is used to solve problems... and the new possibilities created through advances in science. (Focus on transplant tech)
Design and Technologies	Processes and Production Skills	<u>AC9TDE8P01</u> : ...Sequence and document steps in a design process... (Focus on logistics/systems mapping)
HPE	Personal, Social and Community Health	<u>AC9HP8P10</u> : Plan and implement strategies... to enhance health... (Understanding health systems)

Queensland Curriculum (QCAA)

Subject	Syllabus	Content Description
Science	Year 8	Science contributes to solving problems and informing decisions (Innovation).
Design and Technologies	Year 8	Analyze how motion, force and energy are used to control systems (Logistics).
HPE	Year 8	Evaluate health information and services.



Resources Required

- Whiteboard/Smartboard.
- Video Hook: A clip of "Transmedics Organ Care System" (The "Heart in a Box") or a high-speed logistics video (e.g., Formula 1 pit crew or emergency transport).
- Resource: "The Viability Clock" (A chart showing how long different organs last on ice).
- Student Worksheet: "Logistics Logbook: The Race Against Time."
- Map: A map of Australia to demonstrate distance challenges (e.g., Perth to Brisbane).

Skills

- Data Analysis (Interpreting timelines).
- Logistical Planning (Sequencing events).
- Scientific Evaluation (Comparing old vs. new tech).
- Problem Solving (Overcoming distance/time).

Teacher Preparation

- The Metaphor: "The Supply Chain." Just as Amazon needs a system to get a package to you in 24 hours, the donation system needs a "Cold Chain" to get an organ to a patient in 4 hours. If the chain breaks, the gift is lost.
- Key Concepts:
 - Ischaemia: Lack of blood flow.
 - Static Cold Storage: Putting organs on ice (Current standard).
 - Machine Perfusion: Keeping organs warm and beating (Future/Current innovation).
- Visuals: Prepare images of the "Esky" (Ice box) vs. the "Machine" to show the technological leap.

Additional Information

This lesson appeals to students interested in engineering, logistics, and tech. It moves away from the "soft skills" of empathy and into the "hard skills" of system design. It validates that saving lives requires smart systems, not just kind hearts.

